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A Summer Creel Census of
Stormy, Black Oak and Laura Lakes, Vilas County

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ABSTRACT

A partial creel census was conducted on three northeastern Wisconsin lakes of similar size from June 2 through August 23, 1970. The 1,883 anglers interviewed fished 3,103 man-hours and caught 1,983 game fish. Bluegills, coho salmon, rock bass, northern pike, yellow perch, smallmouth bass and walleyes were the most dominant fish in the catch. Few people took advantage of a newly-legalized motor trolling regulation, although attitudes toward motor trolling were largely favorable. Estimated total catch during the census period was 20,856 fish for all three lakes; estimated total man-hours of daylight fishing pressure for all three lakes during this period was 31,685 man-hours. Overall catch rate for all species of fish, by all methods of fishing for all three lakes, was 0.66 fish per man-hour.

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INTRODUCTION

A creel census was conducted on Stormy, Black Oak and Laura Lakes in Vilas County (Fig. 1) from June 2 through August 23, 1970. The purpose of this census was to acquire information concerning fishing pressure and harvest. Partial descriptive information on the three census lakes is summarized below:

<u>Lake Name</u>	<u>Size in Acres</u>	<u>Maximum Depth</u>	<u>Total Alkalinity</u>	<u>Type of Fishery</u>
Stormy	522	63 ft.	17 ppm	Smallmouth bass-panfish-coho salmon
Black Oak	584	85 ft.	38 ppm	Northern pike-walleye-bass-panfish-lake trout-splake
Laura	599	43 ft.	25 ppm	Walleye-bass-muskellunge-panfish

CREEL CENSUS PROCEDURES

A stratified sampling schedule was developed to sample each lake at various times of the day and various days of the week (Table 1). In order to permit travel to and from the Woodruff Headquarters with a forty-hour work week with five working days per week, two-hour checking periods were designed for each lake. Hereafter in this report the word "check" means a designated two-hour observation period for a particular lake. All weekend days were checked; various weekdays were sampled (Table 1). Six check-periods from 9:00 a.m. to 9:00 p.m. were designed to cover daylight hours in a repeating 10-week pattern, except July 3 and July 6 were added to the schedule to adequately sample the July 4 holiday week and provide full working hours for the census clerk. Budget limitations prevented censusing the entire season.

Figure 1: Location St rmy, Black Oak and Laura Lakes

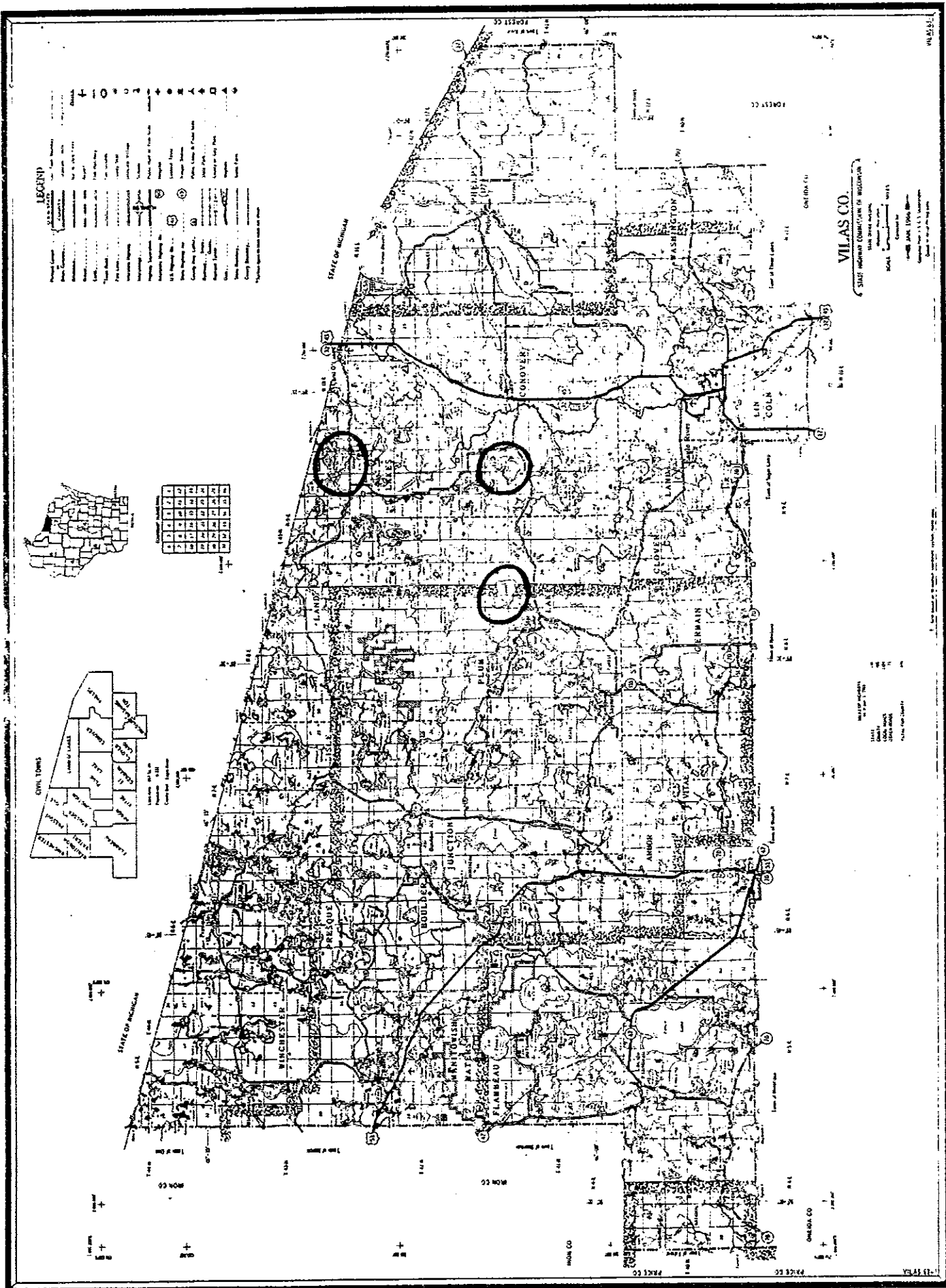


Table 1

Systematic Sampling Schedule for Three Lakes
5-Day Week; 2-Hour Intervals

Lake A = Stormy Lake

Lake B = Black Oak

Lake C = Laura

	9 AM	11 AM	1 PM	3 PM	5 PM	7 PM		9 AM	11 AM	1 PM	3 PM	5 PM	7 PM
June 3 W	B	C	A				14 T						
4 Th				B	C	A	15 W						
5 F	C	A	B				16 Th	B	C	A			
6 S				B	C	A	17 F				B	C	A
7 S				C	A	B	18 S				B	C	A
8 M				A	B	C	19 S				C	A	B
9 T							20 M	A	B	C			
10 W							21 T				A	B	C
11 Th				C	A	B	22 W						
12 F	A	B	C				23 Th						
13 S	C	A	B				24 F				C	A	B
14 S	A	B	C				25 S	C	A	B			
15 M				B	C	A	26 S	A	B	C			
16 T	C	A	B				27 M	B	C	A			
17 W							28 T				B	C	A
18 Th							29 W	C	A	B			
19 F	B	C	A				30 Th						
20 S				A	B	C	31 F						
21 S				B	C	A	Aug. 1 S				A	B	C
22 M				C	A	B	2 S				B	C	A
23 T	A	B	C				3 M						
24 W				A	B	C	4 T				C	A	B
25 Th							5 W	A	B	C			
26 F							6 Th				A	B	C
27 S	B	C	A				7 F						
28 S	C	A	B				8 S	B	C	A			
29 M							9 S	B	C	A			
30 T	B	C	A				10 M						
July 1 W				B	C	A	11 T						
2 Th							12 W	B	C	A			
3 F		C	A	B			13 Th				B	C	A
4 S				C	A	B	14 F	C	A	B			
5 S				A	B	C	15 S				B	C	A
6 M		C	A	B			16 S				C	A	B
7 T							17 M				A	B	C
8 W				C	A	B	18 T						
9 Th	A	B	C				19 W				C	A	B
10 F				A	B	C	20 Th						
11 S	A	B	C				21 F	A	B	C			
12 S	B	C	A				22 S	C	A	B			
13 M	C	A	B				23 S	A	B	C			

The census was conducted in an "active manner", with most fishermen contacts being made on the waters, usually while their fishing trips were still in progress. Results, therefore, are usually for incomplete fishing trips. Due to the necessity of sighting fishermen for this type of census, it was necessary to restrict the census to daylight hours. (Previous knowledge of fishing patterns on these lakes indicated that fishing during darkness hours was minimal.)

Upon arrival at a lake, angler and boat counts were usually made immediately after launching the census boat. The remainder of the two-hour checking time allotted for the lake was spent interviewing fishermen and recording catch data. Data on fishing pressure and harvest were recorded on printed forms (Appendix A, Tables 11 and 12).

Information on hours of motor trolling and fishing by other methods was taken by direct angler interview. If a party did some trolling and some fishing by other methods, attempts were made to record the amount of each. In 1970, motor trolling was legalized for the first time on all three lakes. During the interviews, anglers were asked about their attitude toward the new motor trolling regulations. The questions were generally worded in this approximate manner... "Are you aware that this lake is open to motor trolling?" After the response, the question was asked "Are you for, against or undecided regarding legal motor trolling on this lake?" Various answers were interpreted by the creel census clerk as approving, disapproving or undecided. Pleasure boats were counted separately. The above data were tabulated by time and date.

If there were more fishermen present on the lake than could be contacted during the two-hour allotted check, the census clerk recorded the number not contacted and left in time to arrive at the next lake for its appointed census period. There were rarely more anglers, however, than could be contacted

during the two-hour period. The total number of parties not contacted during the entire census was six (eleven anglers) for Stormy Lake, 39 (79 anglers) for Black Oak Lake, and 26 (56 anglers) for Laura Lake. Travel time between any two of the lakes averaged between 10 and 20 minutes.

Lengths of various game fish taken were measured by the census clerk when time permitted; when lack of time prevented individual fish measurements, numbers of fish by species and size ranges were recorded together with methods the fish were taken (motor trolling or other methods). When coho salmon were noted in the creel (Stormy Lake), each salmon's length was recorded together with the method it was taken, and any fin clips (which designated the year of stocking).

Information on whether each party had a "successful" fishing trip to that point was recorded. A party is considered a single fisherman or group of fishermen in the same boat or fishing together on shore. If two or more boats were together, each boat was considered a separate party. The sole criterion of "success" was whether any fish were present in the party's creel at the time of contact, regardless of size, species, numbers, or amount of time fished.

Optional information was occasionally taken on hometown, baits, etc., but was sporadic in nature and has not been summarized in this report.

RESULTS

Pressure

A total of 963 fishing boats and 377 pleasure boats (not fishing) were counted on all three lakes (Table 2). Overall pressure for all three lakes was 18.6 man-hours per acre for the census. Laura Lake had the highest fishing pressure of the three lakes (20.2 man-hours per acre). For all three lakes, only 157 persons were observed motor trolling compared to 1,872 using other methods of fishing (Table 2). More motor trolling anglers were observed than shore anglers (49 total). A few people didn't know that motor trolling was legal.

A breakdown of fishing pressure by time of day and day of week for each lake is found in Appendix A, Tables 13, 14 and 15. Pressure on all three lakes was highest at the 7 p.m. check. Sunday through Thursday were generally days of higher numbers of anglers. It did not appear that fishing pressure was significantly greater on weekends than on weekdays. All three lakes are located in a vacation area where a large percentage of anglers were probably on extended vacation of a week or more. Pleasure boating, swimming, and other recreation were generally more extensive during late morning and afternoon hours (Appendix A, Table 16). Perhaps some anglers considered the lake more attractive for fishing when these activities subsided. Also, early morning and late afternoon water is often calmer and it's a common impression that fish bite better in early morning and evening than midday.

The possibility that the census clerk may have missed some early morning fishermen who may have left a lake before 9 a.m. and evening anglers who may have started after 9 p.m. is recognized.

Table 2.

Summary of Fishing Pressure Observed on
61 Instantaneous Checks
from June 2 through August 23, 1970

	<u>Stormy Lake</u>		<u>Black Oak Lake</u>		<u>Laura Lake</u>	
	<u>Total</u>	<u>Avg. No. Per Check*</u>	<u>Total</u>	<u>Avg. No. Per Check*</u>	<u>Total</u>	<u>Avg. No. Per Check*</u>
<u>Fishing Boats</u>						
No. observed	264	4.3	351	5.7	348	5.7
No. observed motor trolling	17	0.3	30	0.5	31	0.5
No. observed <u>not</u> motor trolling	247	4.0	321	5.3	317	5.2
<u>Pleasure Boats (not fishing)</u>	132	2.2	166	2.7	79	1.3
<u>Anglers</u>						
No. observed	526	8.6	707	11.6	796	13.0
No. shore anglers observed	21	0.3	18	0.3	10	0.2
No. boat anglers observed	505	8.3	689	11.3	786	12.9
No. boat anglers observed motor trolling	31	0.5	56	0.9	70	1.1
No. boat anglers observed <u>not</u> motor trolling	474	7.8	633	10.4	716	11.7
Average No. Anglers Per Boat	2.0		1.9		2.3	
<u>Fishing effort reported by anglers interviewed:</u>						
Total Man-Hours of Motor Trolling *	54.2		99.5		120.5	
Total Man-Hours of Other Methods =	674.5		775.8		1378.9	
Total Man-Hours All Methods =	728.7		875.3		1499.4	
<u>Estimated Total Man-Hours Fishing Pressure (from Table 4)</u>	8,462		11,119		12,103	
<u>Estimated Man-Hours Fishing Per Acre</u>	16.2		19.0		20.2	

* Check = Instantaneous count during 2-hour period allotted.

Harvest

Table 3 summarizes the numbers and kinds of fish observed in creels during the census and catch rates for each lake.

Coho salmon, rock bass, and smallmouth bass dominated the catch in Stormy Lake; bluegills, northern pike, yellow perch, and rock bass were the predominant fish taken in Black Oak Lake; bluegills, walleyes, rock bass, largemouth bass and yellow perch were the most frequently caught fish in Laura Lake.

Walleye and lake trout are present in Black Oak Lake ; but none were noted during the census. The brook trout taken in Stormy Lake was an accidental introduction included with the June, 1970 coho salmon stockings. Although a number of muskellunge were reported by residents but not seen from Laura Lake, the low number of muskies observed in the creels was less than hypothesized from the lake's reputation. The only evidence of the newly-stocked (May, 1970) coho salmon in Black Oak Lake was a dead 6½ inch coho found in the intermittent outlet of the lake.

Catch rate was generally lower for motor trollers than for anglers using other methods, with the exception of smallmouth bass in Black Oak Lake, walleye in Laura Lake and rock bass and northern pike in Stormy Lake (Table 3). The greatest difference in success between trolling and other methods was for walleyes in Laura Lake. This was partially due to a single party that was well-acquainted and effective with motor trolling techniques. Several other anglers observed their success and technique, and followed suit.

The census did not determine what species various anglers were seeking, and catch rates for each species are based on all fishermen. Overall catch rates for all species of fish by all methods of fishing exceeded 0.5 fish per man-hour on all three lakes (Table 3).

Table 3. CATCH RATES OF CREELED FISH OBSERVED

9.

Species	<u>By Methods Other **</u> <u>Than Motor Trolling</u>		<u>By Motor Trolling</u>		<u>Total All Methods</u>	
	No. Fish Checked	Catch Rate* (fish per man hour)	No. Fish Checked	Catch Rate* (fish per man hour)	No. Fish Checked	Catch Rate* (fish per man hour)
<u>Stormy Lake</u>						
Coho salmon	219	.32	5	.09	224	.31
Bluegill	31	.05	0	.00	31	.04
Smallmouth bass	76	.11	5	.09	81	.11
Rock bass	83	.12	1	.02	84	.12
Northern pike	10	.01	2	.04	12	.02
Pumpkinseed	5	.01	0	.00	5	.01
Yellow perch	17	.02	0	.00	17	.02
Brook trout	1	.001	0	.00	1	.001
<u>Black Oak Lake</u>						
Northern pike	80	.10	9	.09	89	.10
Largemouth bass	22	.03	0	.00	22	.03
Smallmouth bass	20	.03	6	.06	26	.03
Black crappie	37	.05	1	.01	38	.04
Rock bass	70	.09	0	.00	70	.09
Bluegill	267	.34	0	.00	267	.31
Pumpkinseed	56	.07	0	.00	56	.06
Yellow perch	80	.11	0	.00	83	.09
Splake	2	.003	0	.00	2	.002
<u>Laura Lake</u>						
Large	94	.07	13	.11	107	.07
Smallmouth bass	8	.01	0	.00	8	.01
Black crappie	11	.01	0	.00	11	.01
Smallmouth bass	58	.04	1	.01	59	.04
Bluegill	513	.37	2	.02	515	.34
Yellow perch	66	.05	2	.02	68	.05
Rock bass	80	.06	0	.00	80	.05
Pumpkinseed	25	.02	0	.00	25	.02
Muskellunge	2	.002	0	.00	2	.001

Catch Rate for All Species of Fish by All Methods (fish per man hour)=	<u>Stormy Lake</u> 0.62	<u>Black Oak Lake</u> 0.74	<u>Laura Lake</u> 0.58
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* Catch Rate = Fish Caught Per Man-Hour = The number of each species checked divided by the man-hours of fishing reported by the anglers for each method of fishing.

Example: Catch rate of coho salmon taken by all methods of fishing=

$$\frac{\text{Total No. of coho observed in creel} = 224}{\text{Total man-hours (reported by anglers) } 728.7^{***}} = 0.31$$

fishing by all methods

** "Other" includes shore fishermen

*** From Table 2

A breakdown of fish harvest observed by time of day and day of week is presented in Appendix A, Tables 17, 18 and 19. The numbers of creeled fish observed were highest during the 7-9 p.m. check period in Stormy and Black Oak Lakes and in the 11 a.m. - 1 p.m. period for Laura Lake. More fishermen were fishing during the 7-9 p.m. period in Stormy and Black Oak Lakes than other periods, but pressure was also highest during this period in Laura Lake. The 11 a.m. - 1 p.m. period was the second highest fishing pressure period observed on Laura Lake, however. (Appendix A, Tables 13, 14 and 15).

Table 4 summarizes data used in calculation of the estimates of total numbers of fish taken during the entire census. The total number of hours covered by this entire census, the average fishing pressure, and catch rates were used in the calculation of estimated total fish taken by species.

The results of these calculations by fish species in each lake are presented in Table 5.

Catch of coho salmon in Stormy Lake was particularly significant. The annual stocking rate was 5,000 yearling coho; the 1970 partial season coho actually examined during the census, only 18 (8%) fish were not from the 1970 stocking, indicating an estimated 2,413 coho harvested between June 2 and August 23 (from the 5,000 stocked in 1970) or a 48% harvest. It is safe to assume that well over 50% of the 1970 stocking was taken during the entire season, which opened in May, closed in September and reopened in January. Overall management evaluation of the Stormy Lake coho stocking program will be presented in a future paper on the growth, harvest and survival of coho in that lake (McKnight, unpublished).

Table 4, Calculation of Estimated Total
Fish Taken During Census Period

Average number of hours per day covered by census: 12

Total number of days within census period: 82

Total number of daylight hours covered by census period (June 3 - August 23): 984

Average number of anglers fishing by all methods at any day or at any daylight
time period:

Stormy Lake

Black Oak Lake

Laura Lake

8.6*

11.3*

12.3*

Estimated total number of man-hours of fishing pressure during daylight hours
of census period:

Stormy Lake

Black Oak Lake

Laura Lake

$984 \times 8.6 = 8,462.4$

$984 \times 11.3 = 11,119.2$

$984 \times 12.3 = 12,103.2$

Example of calculation of total fish taken during census period:

Estimated total number of Stormy Lake coho salmon caught
from June 3 through August 23, 1970 =

$8,462.4 \times \text{catch rate of coho per man-hour all methods}$
 $(0.31) = 2,623 \text{ salmon.}$

* From Appendix A, Tables 13, 14 and 15.

Table 5.

Estimated* total number of fish caught
June 3 - August 23, 1970, all methods of angling

Stormy Lake

Coho salmon.	2,623
Bluegill	339
Smallmouth bass.	931
Rock bass.	1,015
Northern pike.	169
Pumpkinseed.	85
Yellow perch	170
Brook trout.	9
Total	5,341

Black Oak Lake

Northern pike.	1,112
Largemouth bass.	334
Smallmouth bass.	334
Black crappie.	445
Rock bass	1,001
Bluegill	3,447
Pumpkinseed.	667
Yellow perch	1,001
Splake	22
Total	8,363

Laura Lake

Walleye.	847
Smallmouth bass.	121
Black crappie.	121
Largemouth bass.	484
Bluegill	4,115
Yellow perch	605
Rock bass.	605
Pumpkinseed.	242
Muskellunge.	12
Total	7,152

*Estimated total fish caught = estimated total man-hours fishing pressure during daylight hours of census period x catch rate of various species for all methods of fishing (from Table 3).

(Example calculation in Table 4)

Table 6 presents the angling success* of motor trollers versus non-motor trollers. For all three lakes motor trollers were roughly half as successful as anglers using other methods, considering all species. This may be partially due to inexperience of anglers attempting motor trolling for the first time. Overall angler success* was over 40% for incomplete trips on all three lakes.

Sizes of the fish taken are discussed under "sizes of fish creeled", below.

Motor Trolling Attitude

On all three lakes the majority (57.6 percent) had positive attitudes toward motor trolling (Table 7). Stormy and Black Oak Lakes had the highest percentages of anglers favoring the motor trolling regulations (67.1 and 63.1 percent respectively). No noticeable changes in general proportions of responses were noted as the census progressed.

Sizes of Fish Creeled

Tables 8, 9 and 10 are length frequency distributions of the fish measured from all methods of angling. Too few fish were taken motor trolling (Table 3) for meaningful comparison of sizes of fish taken by motor trolling with other methods. Numbers of fish in the length frequency distribution bracketing several length groups are the result of insufficient time for the census clerk to measure each individual fish. The column "total not measured" at the bottom of the tables represents fish that were counted during the creel checks, but not measured.

Due to the limited portion of the fishing year censused, confidence limits were not calculated for the pressure and harvest information, nor were extensive comparisons made to other full season studies.

* Success as determined by retention of any fish in the creel and based on incomplete trip.

Table 6. Comparison of Motor Trollers' Fishing Success* with those using other Methods

	<u>Stormy Lake</u>	<u>Black Oak Lake</u>	<u>Laura Lake</u>	<u>Total</u>
No. of parties contacted fishing by methods other than motor trolling:	224	274	292	810
No. successful	98	130	115	343
Percent successful	40.1	47.4	39.4	42.3
No. of parties contacted motor trolling but not using other methods:	11	16	25	52
No. successful	3	3	5	11
Percent successful	27.3	18.7	20.0	21.1
No. parties contacted using any method of fishing:	235	290	317	862
No. successful	102	133	120	355
Percent successful	43.4	45.8	37.8	41.2

Table 7. Anglers' Motor Trolling Attitudes

June 3 - August 23, 1970

<u>Lake</u>	<u>No. Fishermen Questioned</u>	<u>No. For Trolling</u>	<u>No. Against Trolling</u>	<u>No. Neither For or Against Trolling</u>
Stormy	508	341 (67.1%)	99 (19.5%)	68 (13.4%)
Black Oak	604	381 (63.1%)	51 (8.5%)	172 (28.4%)
Laura	<u>567</u>	<u>246 (43.3%)</u>	<u>184 (32.5%)</u>	<u>137 (24.2%)</u>
TOTALS	1,679	968 (57.6%)	334 (19.9%)	377 (22.5%)

Table 8.

Waters Stormy Lake
 County Vilas
 Sampling Dates June 3-Aug. 23, 1970
 Gear Angling - all methods

Species and Numbers of Fish in Length Groups

Total Length in Inches	Coho salmon	Bluegill	Small-mouth bass	Rock bass	Northern pike	Pumpkin-seed	Yellow Perch	Brook trout	
3.0 - 3.4									
3.5 - 3.9		1							
4.0 - 4.4									
4.5 - 4.9						1			
5.0 - 5.4			1						
5.5 - 5.9				84		2			
6.0 - 6.4		30	1			1			
6.5 - 6.9	3						14		
7.0 - 7.4	7		1						
7.5 - 7.9	24		1						
8.0 - 8.4	70		5						
8.5 - 8.9	66		8						
9.0 - 9.4	25		6						
9.5 - 9.9	6		9			1	2		
10.0 - 10.4	4		7					1	
10.5 - 10.9	1		6				1		
11.0 - 11.4			9						
11.5 - 11.9			2						
12.0 - 12.9	7		7		1				
13.0 - 13.9	6		2		3				
14.0 - 14.9	2		2		2				
15.0 - 15.9	1		4		1				
16.0 - 16.9	1		2		1				
17.0 - 17.9			1						
18.0 - 18.9			1		1				
19.0 - 19.9									
20.0 - 20.9									
21.0 - 21.9									
22.0 - 22.9									
23.0 - 23.9					1				
24.0 - 24.9					2				
25.0 - 25.9									
26.0 - 26.9									
27.0 - 27.9									
28.0 - 28.9									
29.0 - 29.9									
30.0 - 30.9									
31.0 - 31.9									
32.0 - 32.9									
33.0 - 33.9									
34.0 - 34.9									
35.0 - 35.9									
36.0 - 36.9									
TOTALS	223	31	75	84	12	5	17	1	
	1	0	6	0	0	0	0	0	

Table 9

16.

Waters Black Oak Lake
 County Vilas
 Sampling Dates June 3-Aug. 23, 1970
 Gear Angling - all methods

Species and Numbers of Fish in Length Groups

Total Length in Inches	North. Pike	Large-mouth Bass	Small-mouth Bass	Black Crappie	Rock bass	Blue-gill	Pumpkin-seed	Yellow perch	Splake
3.0 - 3.4									
3.5 - 3.9									
4.0 - 4.4									
4.5 - 4.9									
5.0 - 5.4									
5.5 - 5.9									
6.0 - 6.4		1							
6.5 - 6.9									
7.0 - 7.4									
7.5 - 7.9		1		4	2	1			
8.0 - 8.4		4	1	2	2	3			
8.5 - 8.9			4		5	1			
9.0 - 9.4		2	1	30	3				
9.5 - 9.9			4		1				
10.0 - 10.4		3	2		1				
10.5 - 10.9		2	2	1					
11.0 - 11.4		3	2	1					
11.5 - 11.9		1	1						
12.0 - 12.9	2	1	2						
13.0 - 13.9	3		3						
14.0 - 14.9	6		2						
15.0 - 15.9	10	1							
16.0 - 16.9	16	1							
17.0 - 17.9	7	1	2						1
18.0 - 18.9	12	1							
19.0 - 19.9	5								
20.0 - 20.9	5								1
21.0 - 21.9	4								
22.0 - 22.9	7								
23.0 - 23.9	3								
24.0 - 24.9	1								
25.0 - 25.9									
26.0 - 26.9	1								
27.0 - 27.9	1								
28.0 - 28.9									
29.0 - 29.9	2								
30.0 - 30.9	2								
31.0 - 31.9									
32.0 - 32.9									
33.0 - 33.9	1								
34.0 - 34.9									
35.0 - 35.9									
36.0 - 36.9									
TOTALS	87	22	26	38	61	263	56	81	2
Total not measured	2	0	0	0	9	4	0	2	0

Table 10

17.

Waters Laura Lake
 County Vilas
 Sampling Dates June 3 - Aug. 23, 1970
 Gear Angling - All Methods

Species and Numbers of Fish in Length Groups

Total Length in Inches	Walleye	Small-mouth Bass	Black Crappie	Large-mouth Bass	Bluegill	Yellow Perch	Rock Bass	Pumpkinseed	Muskellunge
3.0 - 3.4									
3.5 - 3.9									
4.0 - 4.4									
4.5 - 4.9									
5.0 - 5.4					9		26		
5.5 - 5.9						12	41	20	
6.0 - 6.4				3					
6.5 - 6.9					500				
7.0 - 7.4									
7.5 - 7.9						54	5		
8.0 - 8.4		1					7		
8.5 - 8.9		1		3					
9.0 - 9.4	1	3	1	3					
9.5 - 9.9		1		1					
10.0 - 10.4	2		5	3			1		
10.5 - 10.9	3		2	3					
11.0 - 11.4	10	1	1	6					
11.5 - 11.9	5		1	6					
12.0 - 12.9	16		1	15					
13.0 - 13.9	21			8					
14.0 - 14.9	25	1		1					
15.0 - 15.9	10			1					
16.0 - 16.9	7			3					
17.0 - 17.9	2			1					
18.0 - 18.9	2								
19.0 - 19.9				1					
20.0 - 20.9									
21.0 - 21.9				1					
22.0 - 22.9									
23.0 - 23.9									
24.0 - 24.9	2								
25.0 - 25.9									
26.0 - 26.9									
27.0 - 27.9									
28.0 - 28.9									
29.0 - 29.9	1								
30.0 - 30.9									
31.0 - 31.9									
32.0 - 32.9									
33.0 - 33.9									
34.0 - 34.9									1
35.0 - 35.9									
36.0 - 36.9									
TOTALS	107	8	11	59	509	66	80	20	1 (40.0)
Total not measured	-	-	-	-	6	2	-	5	-

CONCLUSION

It appears that a partial creel census of this type can provide good indications of angler pressure and harvest for a designated time period. This can be an efficient method of acquiring meaningful data when costs and personnel requirements preclude a complete creel census. Other information such as angler attitude toward new regulations and catch by various methods of fishing can also be readily acquired as part of the investigation. Although the planning and analysis of subsequent data for such a project are extensive compared to non-systematic types of partial creel census, it is felt that the applicability of the results can be worth the additional effort.

Motor trolling appeared to be an insignificant factor in terms of low numbers of anglers using the method, their limited catch and generally favorable attitudes toward the liberalized regulation. The fishing pressure is considered moderate for this portion of the state and overall catch rate for all species on all three lakes by all methods of fishing was 0.66 fish per man-hour.

Creel censuses of this type can be a useful aid in the evaluation of various fish management programs such as fish stocking and habitat improvement. On Stormy Lake, the census indicated that coho salmon management efforts resulted in a high catch of this species.

When combined with separate population estimate studies, exploitation rates could be calculated with information from a creel census of this type conducted through the season.

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FISHING PRESSURE

Lake

[illegible]

No. in Party	Hrs. Fished*	Hrs. Motor Trolling	Hrs. Other Methods	Success (Y or N)	Remarks: (Optional) Hometown, baits, attitude re:trolling, etc
Totals					

CATCH -- COHO SALMON

[illegible]

CATCH -- OTHER SPECIES

[illegible]

Other observations (breakdown of "other" methods; additional notes)

6/4/70-1k

Appendix A, Table 13
Stormy Lake Fishing Pressure

Total and Average Numbers of Anglers Observed Using
All* Methods of Fishing (Averages in Parenthesis)

Hour	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Total	Average
9 a.m.	16(16.0)	0(0.0)	13(13.0)	5(5.0)	9(4.5)	4(4.0)	19(6.3)	66(48.8)	(7.0)
11 a.m.	10(10.0)	0(0.0)	18(18.0)	4(4.0)	4(2.0)	22(5.5)	7(7.0)	65(46.5)	(6.6)
1 p.m.	18(9.0)	6(6.0)	5(2.5)	6(6.0)	18(9.0)	7(3.5)	8(4.0)	68(40.0)	(5.7)
3 p.m.	8(4.0)	7(7.0)	7(7.0)	7(7.0)	10(10.0)	23(11.5)	24(24.0)	86(70.5)	(10.1)
5 p.m.	7(7.0)	19(19.0)	6(6.0)	19(9.5)	4(4.0)	0(0.0)	25(8.3)	80(53.8)	(7.7)
7 p.m.	10(10.0)	11(11.0)	17(17.0)	30(15.0)	15(15.0)	37(12.3)	42(21.0)	162(101.3)	(14.5)
Total	69(56)	43(43)	66(63.5)	71(46.5)	60(44.5)	93(36.8)	125(70.6)	527(360.9)	(51.6/6=8.6)
Avg.	(9.3)	(7.2)	(10.6)	(7.7)	(7.4)	(6.1)	(11.8)	(60.1/7=8.6)	

*Motor trolling, other boat fishing or shore angling.

Total and Average Numbers of Anglers Motor Trolling
When Observed (Averages in Parenthesis)

H.	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Total	Average
9 a.m.	0(0.0)	0(0.0)	0(0.0)	1(1.0)	0(0.0)	0(0.0)	4(1.3)	5(2.3)	(0.3)
11 a.m.	0(0.0)	0(0.0)	0(0.0)	2(2.0)	0(0.0)	2(0.5)	2(2.0)	6(4.5)	(0.6)
1 p.m.	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(0.5)	1(0.5)	(0.1)
3 p.m.	0(0.0)	0(0.0)	1(1.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(1.0)	(0.2)
5 p.m.	0(0.0)	2(2.0)	0(0.0)	2(1.0)	0(0.0)	0(0.0)	3(1.0)	7(4.0)	(0.6)
7 p.m.	0(0.0)	0(0.0)	2(2.0)	3(1.5)	1(1.0)	3(1.0)	2(1.0)	11(6.5)	(0.9)
Total	0(0.0)	2(2.0)	3(3.0)	8(5.5)	1(1.0)	5(1.5)	12(5.8)	31(18.8)	(2.7/6=0.4)
Avg.	(0.0)	(0.3)	(0.5)	(0.9)	(0.2)	(0.3)	(0.9)	(3.1/7=0.4)	

A, Table 1¹
Appendix - Black Oak Lake Fishing Pressure

Total and Average Numbers of Anglers Observed Using
All* Methods of Fishing (Averages in Parenthesis)

Hour	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Total	Average
9 a.m.	15(7.5)	6(6.0)	31(15.5)	17(17.0)	4(4.0)	28(14.0)	13(6.5)	114(70.5)	(10.1)
11 a.m.	6(6.0)	4(4.0)	14(14.0)	19(19.0)	23(11.5)	19(19.0)	39(13.0)	124(86.5)	(12.4)
1 p.m.	16(16.0)	0(0.0)	10(10.0)	3(3.0)	12(6.0)	21(5.3)	10(10.0)	72(50.3)	(7.2)
3 p.m.	10(5.0)	9(9.0)	9(9.0)	20(10.0)	10(5.0)	28(9.3)	29(14.5)	115(61.8)	(8.8)
5 p.m.	15(7.5)	13(13.0)	5(5.0)	15(15.0)	9(9.0)	20(10.0)	24(24.0)	101(83.5)	(11.9)
7 p.m.	13(13.0)	36(36.0)	15(15.0)	38(19.0)	20(20.0)	0(0.0)	59(19.7)	181(122.7)	(17.5)
Total	75(55)	68(68)	84(68.5)	112(83)	78(55.5)	16(57.6)	174(87.7)	707(475.3)	(67.9/6= 11.3)
Avg.	(9.2)	(11.3)	(11.4)	(13.8)	(9.2)	(9.6)	(14.6)	(79.1/7=11.3)	

*Motor trolling, other boat fishing or shore angling.

Total and Average Numbers of Anglers Motor Trolling
When Observed (Averages in Parenthesis)

Hour	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Total	Average
9 a.m.	1(0.5)	0(0.0)	1(0.5)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	3(1.0)	(0.1)
11 a.m.	0(0.0)	2(2.0)	0(0.0)	0(0.0)	4(2.0)	0(0.0)	7(3.5)	13(7.5)	(1.1)
1 p.m.	0(0.0)	0(0.0)	2(2.0)	0(0.0)	0(0.0)	8(2.0)	2(2.0)	14(6.0)	(0.9)
3 p.m.	2(1.0)	1(1.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	2(1.0)	5(3.0)	(0.4)
5 p.m.	3(1.5)	0(0.0)	2(2.0)	0(0.0)	2(2.0)	3(1.5)	3(3.0)	13(10)	(1.4)
7 p.m.	0(0.0)	3(3.0)	3(3.0)	0(0.0)	0(0.0)	0(0.0)	2(0.7)	8(6.7)	(0.9)
Total	7(3.0)	6(6.0)	8(7.5)	0(0.0)	6(4.0)	11(3.5)	16(10.2)	56(34.7)	(4.8/6= 0.8)
Avg.	(0.5)	(1.0)	(1.3)	(0.0)	(0.7)	(0.6)	(1.7)	(5.8/7=0.8)	

Appendix ^{A, Table 15} - Laura Lake Fishing Pressure

Total and Average Numbers of Anglers Observed Using
All* Methods of Fishing (Averages in parenthesis)

Hour	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Total	Average
9 a.m.	19(19.0)	4(4.0)	5(5.0)	6(6.0)	17(8.5)	37(9.2)	6(6.0)	94(57.7)	(8.2)
11 a.m.	25(12.5)	13(13.0)	31(15.5)	13(13.0)	26(13)	34(17.0)	17(8.5)	159(92.5)	(13.1)
1 p.m.	9(9.0)	14(14.0)	17(17.0)	12(12.0)	33(16.5)	3(3.0)	25(8.3)	113(79.8)	(11.4)
3 p.m.	19(19.0)	28(28.0)	5(5.0)	26(13.0)	9(9.0)	0(0.0)	18(6.0)	105(80.0)	(11.4)
5 p.m.	9(9.0)	7(7.0)	12(12.0)	39(19.5)	3(3.0)	46(15.3)	13(6.5)	129(72.3)	(10.3)
7 p.m.	49(24.5)	24(24.0)	14(14.0)	14(14.0)	22(22.0)	51(25.5)	12(12.0)	186(136.0)	(19.4)
Total	130(93.0)	90(90.0)	84(68.5)	110(77.5)	110(72.0)	71(70.0)	91(47.3)	786(518.3)	(73.8/6=12.3)
Avg.	(15.5)	(15.0)	(11.4)	(12.9)	(12.0)	(11.7)	(7.9)	(86.4/7=12.3)	

* Motor trolling, other boat fishing or shore angling.

Total and Average Numbers of Anglers Motor Trolling
When Observed (Averages in parenthesis)

Hour	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Total	Average
9 a.m.	1(1.0)	0(0.0)	3(3.0)	2(2.0)	2(1.0)	2(0.5)	3(3.0)	13(10.5)	(1.5)
11 a.m.	2(1.0)	0(0.0)	5(2.5)	0(0.0)	0(0.0)	3(1.3)	0(0.0)	10(4.8)	(0.7)
1 p.m.	1(1.0)	0(0.0)	0(0.0)	0(0.0)	1(0.5)	0(0.0)	0(0.0)	2(1.5)	(0.2)
3 p.m.	3(3.0)	0(0.0)	3(3.0)	0(0.0)	0(0.0)	0(0.0)	3(1.0)	9(7.0)	(1.0)
5 p.m.	0(0.0)	0(0.0)	1(1.0)	11(5.5)	0(0.0)	7(2.4)	0(0.0)	19(8.9)	(1.3)
7 p.m.	7(3.5)	2(2.0)	0(0.0)	4(4.0)	2(2.0)	2(1.0)	0(0.0)	17(12.5)	(1.8)
Total	14(9.5)	2(2.0)	12(9.5)	17(11.5)	5(3.5)	14(4.3)	6(4.0)	70(44.3)	(6.5/6=1.1)
Avg.	(1.6)	(0.3)	(1.6)	(1.9)	(0.6)	(0.7)	(0.7)	(7.4/7=1.1)	

Appendix A

Table 16 - Average Number of Pleasure Boats (Not Fishing) Noted
by Time of Day

	<u>Stormy Lake</u>	<u>Black Oak Lake</u>	<u>Laura Lake</u>
9 AM	1.5	2.1	0.7
11 AM	2.0	2.7	1.7
1 PM	2.8	3.3	1.7
3 PM	3.8	3.8	0.8
5 PM	1.4	3.3	1.6
7 PM	1.5	0.8	1.1

APPENDIX A, Table 17. Stormy Lake Fish Harvest - All Methods of Fishing

Total Number and Catch Index* of Creeled Fish Observed by Times of Day
(Catch Index in Parentheses)

Number of Checks Time	10 9 AM	11 11 AM	12 1 PM	9 3 PM	9 5 PM	10 7 PM	Totals 61 --
<u>Species</u>							
Coho salmon	11(1.1)	8(0.7)	44(3.7)	76(8.4)	36(4.0)	49(4.9)	224
Bluegill	0(0.0)	3(0.3)	2(0.2)	5(0.6)	16(1.8)	5(0.5)	31
Smallmouth bass	9(0.9)	12(1.1)	22(1.8)	8(0.9)	5(0.6)	25(2.5)	81
Rock bass	0(0.0)	10(0.9)	17(1.4)	9(1.0)	8(0.9)	40(4.0)	84
Northern pike	1(0.1)	3(0.3)	0(0.0)	3(0.3)	1(0.1)	4(0.4)	12
Pumpkinseed	1(0.1)	0(0.0)	0(0.0)	0(0.0)	1(0.1)	3(0.3)	5
Yellow perch	0(0.0)	2(0.2)	2(0.2)	0(0.0)	0(0.0)	13(1.3)	17
Brook trout	<u>1(0.1)</u>	<u>0(0.0)</u>	<u>0(0.0)</u>	<u>0(0.0)</u>	<u>0(0.0)</u>	<u>0(0.0)</u>	<u>1</u>
Total	23	38	87	101	67	139	455

Total Number and Catch Index* of Creeled Fish Observed by Day of Week
(Catch Index in Parentheses)

Number of Checks	8	6	6	8	6	12	12	Totals 58
<u>Species</u>	<u>Mon.</u>	<u>Tues.</u>	<u>Wed.</u>	<u>Thurs.</u>	<u>Fri.</u>	<u>Sat.</u>	<u>Sun.</u>	
Coho salmon	35(4.4)	13(2.2)	30(5.0)	8(1.0)	51(8.5)	46(3.8)	41(3.4)	224
Bluegill	4(0.5)	6(1.0)	0(0.0)	14(1.8)	4(0.7)	0(0.0)	3(0.3)	31
Smallmouth bass	13(1.6)	2(0.3)	7(1.2)	12(1.5)	8(1.3)	13(1.1)	26(2.2)	81
Rock bass	16(2.0)	3(0.5)	10(1.7)	40(5.0)	0(0.0)	12(1.0)	3(0.3)	84
Northern pike	0(0.0)	1(0.2)	7(1.2)	3(0.4)	0(0.0)	0(0.0)	1(0.1)	12
Pumpkinseed	1(0.1)	1(0.2)	0(0.0)	2(0.3)	0(0.0)	0(0.0)	1(0.1)	5
Yellow perch	2(0.3)	2(0.3)	0(0.0)	10(1.3)	3(0.5)	0(0.0)	0(0.0)	17
Brook trout	<u>0(0.0)</u>	<u>0(0.0)</u>	<u>1(0.2)</u>	<u>0(0.0)</u>	<u>0(0.0)</u>	<u>0(0.0)</u>	<u>0(0.0)</u>	<u>1</u>
Total	71	28	55	89	66	71	75	455

* Catch index = Average no. of fish per two hour check.

The above catch figures do not account for pressure differences.

Total No. checks = 58 because no creels checked on three different days.

Table 13
APPENDIX A. Black Oak Lake Fish Harvest - All Methods of Fishing

Total Number and Catch Index* of Creeled Fish Observed by Times of Day
(Catch Index in Parenthesis)

	<u>Totals</u>						
Number of Checks	10	10	10	11	10	10	61
Time	9 AM	11 AM	1 PM	3 PM	5 PM	7 PM	—
<u>Species</u>							
Northern pike	15(1.5)	7(0.7)	5(0.5)	14(1.3)	10(1.0)	38(3.8)	89
Largemouth bass	2(0.2)	7(0.7)	2(0.2)	0(0.0)	5(0.5)	6(0.6)	22
Smallmouth bass	3(0.3)	3(0.3)	9(0.9)	3(0.3)	5(0.5)	3(0.3)	26
Black crappie	2(0.2)	0(0.0)	7(0.7)	1(0.1)	5(0.5)	23(2.3)	38
Rock bass	8(0.8)	12(1.2)	8(0.8)	5(0.5)	8(0.8)	29(2.9)	70
Bluegill	51(5.1)	32(3.2)	12(1.2)	57(5.2)	19(1.9)	96(9.6)	267
Pumpkinseed	1(0.1)	2(0.2)	0(0.0)	33(3.3)	6(0.6)	14(1.4)	56
Yellow perch	9(0.9)	3(0.3)	31(3.1)	13(1.2)	7(0.7)	29(2.0)	83
Splake	0(0.0)	1(0.1)	0(0.0)	0(0.0)	0(0.0)	1(0.1)	2
Total	91	67	74	126	65	230	653

Total Number and Catch Index* of Creeled Fish Observed by Day of Week
(Catch Index in Parenthesis)

	<u>Totals</u>							
Number of Checks	8	6	7	8	8	12	12	61
<u>Species</u>	<u>Mon.</u>	<u>Tues.</u>	<u>Wed.</u>	<u>Thurs.</u>	<u>Fri.</u>	<u>Sat.</u>	<u>Sun.</u>	
Northern pike	6(0.8)	2(0.3)	16(2.3)	13(1.6)	13(1.6)	8(0.7)	31(2.6)	39
Largemouth bass	3(0.4)	3(0.5)	1(0.1)	3(0.4)	2(0.3)	1(0.1)	9(0.8)	22
Smallmouth bass	4(0.5)	2(0.3)	3(0.4)	2(0.3)	2(0.3)	6(0.5)	7(0.6)	26
Black crappie	3(0.4)	4(0.7)	15(2.1)	1(0.1)	3(0.4)	0(0.0)	12(1.0)	38
Rock bass	6(0.8)	4(0.3)	16(2.3)	13(2.3)	11(1.4)	9(0.8)	6(0.5)	70
Bluegill	7(0.9)	38(6.3)	66(9.4)	50(6.3)	15(1.9)	51(4.3)	40(3.3)	267
Pumpkinseed	25(3.1)	1(0.2)	8(1.1)	8(1.0)	0(0.0)	0(0.0)	14(1.2)	56
Yellow perch	5(0.6)	8(1.3)	11(1.6)	10(1.3)	7(0.8)	26(2.0)	16(1.3)	83
Splake	0(0.0)	0(0.0)	0(0.0)	1(0.1)	0(0.0)	0(0.0)	1(0.1)	2
Total	59	62	136	106	53	101	136	653

* Catch index = No. of fish per two hour check.

(Above does not account for pressure differences)

Table 12
APPENDIX A, Laura Lake Fish Harvest - All Methods of Fishing

Total Number and Catch Index* of Creeled Fish Observed by Times of Day
(Catch Index in Parenthesis)

Number of Checks Time	10 9 AM	10 11 AM	10 1 PM	10 3 PM	11 5 PM	10 7 PM	Totals 61 —
<u>Species</u>							
Walleye	16(1.6)	14(1.4)	7(0.7)	25(2.5)	28(2.5)	17(1.7)	107
Smallmouth bass	2(0.2)	0(0.0)	4(0.4)	1(0.1)	0(0.0)	1(0.1)	8
Black crappie	1(0.1)	0(0.0)	1(0.1)	0(0.0)	3(0.3)	6(0.6)	11
Largemouth bass	10(1.0)	10(1.0)	4(0.4)	14(1.4)	3(0.3)	18(1.8)	59
Bluegill	40(4.0)	130(13.0)	83(8.3)	134(13.4)	83(7.5)	45(4.5)	515
Yellow perch	4(0.4)	8(0.8)	17(1.7)	24(2.4)	6(0.5)	9(0.9)	68
Rock bass	21(2.1)	22(2.2)	15(1.5)	3(0.3)	14(1.3)	5(0.5)	80
Pumpkinseed	0(0.0)	0(0.0)	6(0.6)	17(1.7)	2(0.2)	0(0.0)	25
Muskellunge	1(0.1)	0(0.0)	0(0.0)	0(0.0)	1(0.1)	0(0.0)	2
Total	95	184	137	218	140	101	875

Total Number and Catch Index* of Creeled Fish Observed by Days of Week
(Catch Index in Parenthesis)

Number of Checks	8	6	7	8	8	12	12	Totals 61 —
<u>Species</u>	<u>Mon.</u>	<u>Tues.</u>	<u>Wed.</u>	<u>Thurs.</u>	<u>Fri.</u>	<u>Sat.</u>	<u>Sun.</u>	
Walleye	13(1.6)	1(0.2)	10(1.4)	42(5.3)	0(0.0)	29(2.4)	12(1.0)	107
Smallmouth bass	2(0.3)	0(0.0)	0(0.0)	2(0.3)	1(0.1)	1(0.1)	2(0.2)	8
Black crappie	4(0.5)	0(0.0)	0(0.0)	1(0.1)	2(0.3)	1(0.1)	3(0.3)	11
Largemouth bass	17(2.1)	2(0.3)	10(1.4)	8(1.0)	9(1.1)	10(0.8)	3(0.3)	59
Bluegill	38(4.8)	71(11.8)	62(8.9)	61(7.6)	92(11.5)	87(7.3)	104(8.7)	515
Yellow perch	10(1.3)	14(2.3)	2(0.3)	5(0.4)	10(1.3)	12(1.0)	15(1.3)	68
Rock bass	0(0.0)	0(0.0)	5(0.7)	19(2.4)	26(3.3)	23(1.9)	7(0.6)	80
Pumpkinseed	0(0.0)	0(0.0)	0(0.0)	0(0.0)	18(2.3)	0(0.0)	7(0.6)	25
Muskellunge	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	2(0.2)	0(0.0)	2
Total	84	88	89	138	158	165	153	875

* Catch index = number of fish per two hour check.

(Pressure not accounted for in this table.)

NOTE: Total of 61 checks instead of 62 because one day counted fishermen only
but did not interview.